Determinations of the Excess length-of-Day Since 1630

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The Kalman Earth Orientation Filter (KEOF) is used at JPI, to combine independent observations of the Earth's rotation parameters, producing smoothed, interpolated estimates of polar motion (PM) and UT1–TAI, as well as estimates of their excitation functions such as the length-of-day (led). Prior to their combination, adjustments to the data sets are made in order to place them within a common reference frame. Recently, a number of lod data sets have been determine d at JPI, by combining the observations summarized in '1'able 1. The resulting lod data sc is, summarized in '1'able 2, span different time intervals depending upon the particular subset of observations being combined, with the longest series, spanning 1630 1990, being obtained by combining all Of the observations, The determination of these lod data sets and their comparison with series of climate indicators such as the Southern Oscillation Index will be discussed.

TABLE 1. Data Sets Combined

Data Set Name	Observed Component	Number of Observat ions	Span of Observations
Global Positioning System			
JPI.FLINN Analysis	PM	185	1992.5 -1993,1
Very Long Baseline Interferometry			
JPL92R01	T,V	990	1978.8- 1993.()
CDPGLB869	UT1,PM	1412	1979.6–1992.7
UT1MC03FEB93	UT1	1938	1984.31993.1
IRIS27JAN93	UT1,PM	38	1992.7- 1993.1
Satellite Laser Ranging			
CSR92L01	i'M	1709	1976,4- 199?.()
Lunar Laser Ranging			
JPL92M01	UT0,VOI,	1199	1970.3 -1992.1
Optical Astrometry			
Int. Lat. Service	i'M	951	1899.8]979,()
Washington }'7,'1'	UT0	345	1956.0 1984.8
BIHSO84A02	UT1,PM	1461	1962.0 198?. ()
1 unar occultation			
Stephenson &	*,,	30	1630.()-1775.()
Morrison (1984)	AT	2.01	1780,0 1980.0
Morrison (1979)	AT	396	1943.0 197s. ()

TABLE 2. Determinations of Excess I ength-of-Day

Data Set Name.	Number of Determinations	Interval Between Determinations	span of Determinations
SPACE92I.	6091	1 day	1976.4 -1993,1
COMB92I.	2269	5 day	1962.0 1993.1
ASTRO92I,	600	1 month	1943.0 1993.()
LUNAR92L1	214	1 year	1780.0 1993.()
i.UNAR92I.5	73	5 year	1630,01 990.()